

thickness and such that the minimum predetermined wall thickness is unaffected by the winding variations.

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REMARKS

The Examiner is respectfully requested to review this application which has been amended after a careful consideration of the Examiner's comments in the above-identified Office Action and the references cited therein, the Examiner's comments being appreciated to correct and clarify the specification and claims. In the above-identified Office Action, the Examiner continued the rejection of the claims on combinations of the the Rinehart, Tobin and Schmunk references. Claims 1, 5, 8, 13, 15 and 17-20, have been cancelled without prejudice or disclaimer of the invention recited therein and claim 36 has been amended to more distinctly point out applicants' invention. Independent claims 24, 28 and 36 as amended, and claims 25-26, 33 and 39, depending therefrom are neither disclosed nor suggested by the references or any suggested combination thereof. Thus these claims are considered to be in allowable form.

The undersigned attorney apologizes to the Examiner for not adding in the remarks in Amendment A that there is no suggestion to combine the references. This was implied when the undersigned referred to the prior art as being different approaches and the fact that the Examiner has not pointed to any suggestion to combine these different approaches and compositions in any way. Further, the undersigned meant that there was no suggestion to combine the references when it was stated that the references neither disclose nor suggest the invention recited in the claims, i.e. meaning no suggestion to form any combination from the references. Additionally, the combination of references proposed by the Examiner do not result in the claimed subject matter and the Examiner does not even realize that the Office Actions do not address this serious shortfall. If the claimed subject matter is obvious in view of the references, it is certainly strange that the inventor of the Tobin reference who is also a coinventor of the present invention did not suggest to the common assignee of both the Tobin reference and the present invention that such a fuse tube be produced. Further, the assignee of the Rinehart reference was aware of the Tobin reference but did not form such an invention at that time or since even though the two assignees are in competition with each other. Certainly, this is a situation of long-felt need that points away from obviousness.

The Examiner in the First Office Action rejected claims 36-39 without any mention of how the prior art met the terms of the claims. Now, the Examiner in the Second Office Action finally rejects claim 36, as amended, still has not mentioned anything about how the references suggest the recited invention, and mentions that all of the language in the remarks is not found in the claims. The Examiner comments at the end of paragraph 4 that the uniform winding and minimum wall thickness being unaffected by winding variations is not recited in the claims. Claim 36 does recite these features, instead of stating "unaffected by the winding variations", claim 36 states that "the uniformity being such that variations in the thickness of the tube are significantly less than the minimum predetermined wall thickness". The Examiner does not mention that this claim language is discussed a few lines before the quoted language and does not seem to understand that the quoted language is a conclusion/summary of what is achieved by the claimed subject matter, i.e. the invention as claimed provides this feature, the claim language being thought to be more positive than the result language the Examiner objected to.

Further, it is not understood how the Examiner carefully notes the difference between some of the language in the remarks and the claim 36, as amended, but has not in either office action stated how the prior art is supposed to suggest the terms of claim 36, as amended (and originally found in claim 38), and has not argued any combination that would result in the claimed subject matter. In any case, claim 36 has been further amended to add the feature noted by the Examiner.

In paragraph 4, the Examiner also states that applicants have not demonstrated that their fuse tubes produce unexpected results over the prior art teachings. The Examiner is directed to the recitation of the facts at page 4, lines 17 and as set forth in the specification at page 4, line 34 to page 5, line 3 and at page 7, line 28 to page 8, line 34. These achieved ratings can be compared to the prior art as discussed in the prior remarks at page 4 lines 8-20 (12000 amperes for the invention versus 5000 amperes for the prior art). Further, the prior art teaches different approaches to try to achieve a fuse tube so the claimed subject matter is unexpected based on these differences. The fact that the prior art had not suggested or achieved this claimed type of fuse tube (now in production) demonstrates its unexpectedness. For example, as discussed, the Rinehart patent uses 40-80% by weight of aluminum trihydrate, resulting in a relatively more expensive fuse tube of lower strength than applicants' claimed invention while having lower ratings, 5000 amperes for the prior art versus 12000 amperes for the claimed invention. The

claimed invention also makes it possible to operate over a wide current range, i.e. not only having a high rating but operating at lower currents also. A more detailed discussion of the claimed features of the invention and differences over any suggested combination of the prior art is found below.

Applicants' invention as recited in claim 24, as amended, is directed to a fuse tube having a multiple layered laminate construction including an inner arc-quenching surface layer comprised of a wound filamentous fiber material supported in a matrix comprising a thermosetting resin and melamine, and also including at least one outer layer of filament wound glass fiber reinforced thermosetting resin, the outer layer being bonded to the inner arc-quenching surface layer whereby no dielectric or mechanical interface is present between the inner and outer layers, the inner arc-quenching surface layer comprising at least 10% by weight melamine, at least 10% by weight of the filamentous fiber material and at least 40% by weight of the thermosetting resin.

This fuse tube is neither disclosed nor suggested by the prior art, taken either singly or in any combination thereof. For example, this type of fuse tube provides high-strength and is suitable for interrupting currents over a wide current range, e.g. from as low as 100 amperes through 12000 amperes RMS. The combination of strength to survive the tremendous pressures during arc interruption and the ability to provide desirable arc-extinguishing characteristics over this extremely wide range is achieved by the recited structure. The results achieved by this composition are unexpected with the recited materials.

For example, the Rinehart reference teaches using epoxy resin, fiber and 40-80% by weight of aluminum trihydrate. This is a totally different approach that requires a high percentage of the inorganic filler and the reference only discusses a rating of 5000 amperes. The Tobin reference is another different approach that teaches giving strength to the fuse tube by molding thermosetting and arc-extinguishing materials about a fiberglass cloth layer or sheath located nearer the exterior, the materials including epoxy resins and melamine or like materials.

The Examiner has not pointed to any suggestion as to why these two different approaches with different constituent compositions would be combined. Thus, claim 24, as amended, is considered to be allowable. Similarly, claim 28, as amended, is also considered to be allowable for the same reasons being directed to a fuse tube with the recited material composition and also including a tapered bore to achieve a wide current interrupting range. Thus, claims 24 and 28, as

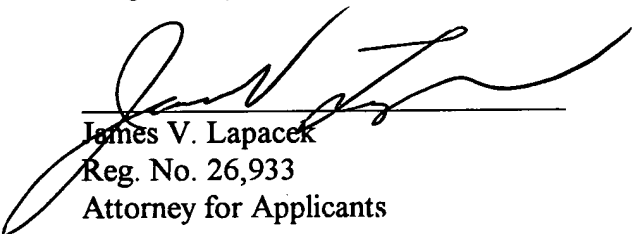
amended, and claims 25, 26, and 33, depending from claims 24 and 28, are considered to be in a condition for allowance, the dependent claims reciting additional features.

Applicants' invention as recited in claim 36, as amended, recites a method of fabricating an arc-quenching tube via the winding of a first fiber in one or more winding passes, the method comprising winding the arc-quenching tube such that the first fiber lays flat and does not overlap in each of the one or more winding passes whereby uniformity is achieved in the thickness of the tube, the method further comprising forming a predetermined taper within the arc-quenching tube wherein the predetermined taper defines a minimum predetermined wall thickness of the tube, the uniformity being such that variations in the thickness of the tube are significantly less than the minimum predetermined wall thickness. The prior art references, taken either singly or in any combination, neither discloses nor suggests the combination of a taper and a uniformity of winding being so achieved for producing such a fuse tube. Certainly, the Examiner has not set forth any reasons why the references suggest the claimed invention. The Examiner broadly concludes that it is obvious to "minimize gaps" without citation of any art. However, even the Examiner's broad unsupported conclusion does not suggest applicants' invention since claim 36, as amended, is directed to a uniformity of winding, the recited uniformity being such that variations in the thickness of the tube are significantly less than the minimum predetermined wall thickness, this claimed feature resulting in the minimum wall thickness that is defined by the desired taper being unaffected by the winding variations. This provides as shown in FIGS. 4 and 5, a minimum thickness of the inner layer of the fuse tube while ensuring that the normal erosion of the arc-extinguishing bore during repetitive use does not extend into the outer layer that does not have the same arc-extinguishing properties. Such is important when providing the high strength and wide current interrupting range in a fuse tube that can interrupt 12000 amperes. Thus, claim 36, as amended, and claim 39 depending therefrom are allowable, claim 39 additionally reciting the winding of a second fiber over the first fiber.

Accordingly, claims 24-26, 28, 33, 36 and 39, as amended, are considered to patentably distinguish over the cited reference, and these claims and this application are considered to be in a condition for allowance. Entry of the present amendment and a favorable action to that end and allowance of this application by the Examiner are respectfully requested. This amendment is believed to the claims in allowable form. This response was necessitated by the fact that the Examiner has failed to point out how the recited invention is suggested by the prior art and has

apparently ignored the claimed features. If the Examiner feels that clarification of any issue or comment herein would be helpful to facilitate prosecution of this application, the Examiner is respectfully requested to contact the undersigned attorney at the number listed below for a telephonic interview or to arrange a personal interview.

Respectfully submitted,



James V. Lapacek  
Reg. No. 26,933  
Attorney for Applicants

S&C Electric Company  
6601 N. Ridge Blvd.  
Chicago, IL 60626  
Telephone: (773) 338-1000  
Facsimile: (773) 338-1682

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